

Ampicillin*

Class: β -lactam

Overview

Ampicillin, commonly known as a broad-spectrum penicillin, is a type of aminopenicillin, a semisynthetic group of β -lactams that were developed for effectiveness against both gram-negative and gram-positive organisms. Aminopenicillins were created by joining penicillin to an amino group or side chain. Addition of the side chain significantly changed the activity of the drug against some bacteria. Initially these antimicrobials were effective against *Proteus mirabilis*, *E. coli*, *Shigella*, *Salmonella*, *Hemophilus* and *Neisseria* species. However due to changes in susceptibility, ampicillin is no longer the drug of choice in treating infections with several of these organisms, such as *E. coli* urinary tract infections, unless culture and sensitivity results indicate susceptibility.

The mechanisms of action of ampicillin are interference with cell wall synthesis by attachment to penicillin-binding proteins (PBPs), inhibition of cell wall peptidoglycan synthesis and inactivation of inhibitors to autolytic enzymes.

Resistance

Ampicillin is also generally inactivated by β -lactamases (See penicillin section for information on acquisition of resistance to β -lactams.). In recent years *Enterococcus faecium* and *Streptococcus pneumoniae* have begun to exhibit, through mutations, low-affinity PBPs as a mechanism of resistance to aminopenicillins.

Effectiveness

Ampicillin and amoxicillin share the same spectra of activity, although amoxicillin is characterized by superior bio-availability. Genera regarded to be generally susceptible to ampicillin and amoxicillin are *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Clostridium*, *Escherichia*, *Klebsiella*, *Shigella*, *Salmonella*, *Proteus* and *Pasteurella*, although many of these bacteria have acquired resistance. Ampicillin is often used to treat urinary infections with Gram-negative enteric bacterial etiologies. The drug is also used to treat respiratory tract infections. Additionally ampicillin is uniformly effective against group B *Streptococcus*, but is ineffective against *Enterobacter*, *Hemophilus influenzae*, *Pseudomonas* and indole positive *Proteus* infections.

See the penicillin section for an explanation of uptake in body fluids and CSF.

***References available by request. Call the Infectious Disease Epidemiology Section, Office of Public Health, Louisiana Department of Health and Hospitals (504-219-4563)**